

REMARKS

Claims 1-16 are pending in this application. By this Amendment, claims 1, 3-9, and 11-16 have been amended and claims 2 and 10 have been canceled without prejudice to or disclaimer of the subject matter found therein. The amendments to claims 3-6, 9, 11, and 13-16 are to conform to U.S. patent practice or to correct minor informalities therein. The amendments, at least to claims 3-6, 9, 11, and 13-15, are non-narrowing and have no affect on patentability. Also, a substitute Abstract has been provided to address minor informalities found in the Abstract as filed.

Applicant filed an Information Disclosure Statement (IDS) on March 2, 2004. The form PTO-1449 accompanying the IDS identified 20 references. A copy of the form PTO-1449 and a copy of the date-stamped receipt showing receipt by the U.S. Patent and Trademark Office are attached. Applicant respectfully requests that the enclosed form PTO-1449 be initialed and returned to the Applicant showing consideration of the references by the Examiner.

Also, the Applicant filed a Claim for Priority on March 2, 2004. Attached is a copy of the cover sheet and first page of the certified copy of the priority document as filed on December 4, 2002, along with the copy of the date-stamped receipt showing receipt by the U.S. Patent and Trademark Office. Accordingly, it is respectfully requested that acknowledgement is made of receipt of the priority document perfecting Applicant's claim for foreign priority based on the application filed in Japan on December 4, 2002.

In paragraph 2, on page 2 of the Office Action, claims 7-11 and 13-15 were rejected under 35 U.S.C. §102(b) as being anticipated by Chase, U.S. Patent No. 4,077,495. The rejection is respectfully traversed.

Applicant's invention of claim 7 calls for an energy absorber, comprising a plurality of independent hollow tubes of fiber reinforced composite material integrally formed by

bundling only said hollow tubes of fiber reinforced composite material, said hollow tubes of fiber reinforced composite material being arranged so as to reduce a number of intersecting walls of said hollow tubes of fiber reinforced composite material, wherein each of said hollow tubes of fiber reinforced composite material is formed in a plurality of layers in a thickness direction, a film-shaped layer material having lower strength than that of a base material being inserted between end portions of said plurality of layers. Chase fails to disclose these features.

Applicant's invention of claim 8 calls for an energy absorber, comprising a plurality of independent hollow tubes of fiber reinforced composite material bundled by an outer layer of fiber reinforced composite material, wherein said hollow tubes of fiber reinforced composite material and said outer layer of fiber reinforced composite material are arranged so as to reduce a number of intersecting walls of at least one of said hollow tubes of fiber reinforced composite material and said outer layer of fiber reinforced composite material, wherein at least said outer layer of fiber reinforced composite material for bundling said hollow tubes are formed in a plurality of layers in a thickness direction, a film-shaped layer material having lower strength than that of a base material being inserted between end portions of said plurality of layers. Chase fails to disclose these features.

In Chase, the energy absorber 20 is for use in a pressure relief valve for terminating a rocket flight (Background of the Invention). As shown in Fig. 1, the extension on pipe 10 has an end cap 18 secured thereto, and an energy absorber 20 is located between the piston 12 and the end cap 18 (col. 2, lines 55-57). As Chase shows in Fig. 3, the energy absorber 20 includes a honeycomb section. Accordingly, Chase merely discloses that the energy absorber 20 may have a honeycomb cross-section (col. 1, lines 34-35).

Applicant's energy absorber, on the other hand, includes the features that the hollow tubes of fiber reinforced composite material (and the outer layer of fiber reinforced composite

material) are arranged so as to reduce the number of intersecting walls of the hollow tubes of fiber reinforced composite material (and/or the outer layer of fiber reinforced composite material), and each of the hollow tubes of fiber reinforced composite materials (and/or the outer layer of fiber reinforced composite material) is formed in a plurality of layers in a thickness direction, a film-shaped layer material having lower strength than that of a base material being inserted between end portions of the plurality of layers. These above-described features are recited in independent claims 7 and 8. Looking at Fig. 11, it is clear that the number of intersecting walls is three at each load so that the initial load peak in the event of a crash can be suppressed. Accordingly, one of the structural features of claims 7 and 8, for example, is the hollow tubes are formed in a plurality of layers in a thickness direction, a film-shaped layer material having lower strength than that of a base material being inserted between end portions of the plurality of layers (page 12, lines 31-35). One of the advantages of this structure, for example, is that the harmful initial low peak in the case of a crash of a helicopter can be suppressed so that the crew member's survivability can be greatly improved (page 12, lines 35 to page 13, line 2). Chase fails to disclose this feature because Chase merely discloses a honeycomb energy absorber and Chase's honeycomb energy absorber cannot suppress the harmful initial load peak in the case of a crash of a helicopter. Thus, Chase fails to perform the function as recited in claims 7 and 8.

Accordingly, Chase does not literally disclose each and every feature of Applicant's claimed invention as recited in claims 7 and 8 and the rejection under 35 U.S.C. §102 is inappropriate. Further, for the reasons discussed, Chase does not suggest the features recited in claims 7 and 8. Because Chase does not anticipate or suggest the features of claims 7 and 8, Chase cannot possibly anticipate or suggest the subject matter of claims 9, and 13-15, which depend from claim 7, and claim 11, which depends from claim 8, for the reasons discussed with respect to claims 7 and 8 and for the additional features recited therein. As to

the rejection of claim 10, this rejection is made moot by the cancellation of claim 10. It is respectfully requested that the rejection be withdrawn.

On page 2 of the Office Action, claims 12 and 16 were rejected under 35 U.S.C. §103(a) over Chase in view of Gertz et al. (Gertz), U.S. Patent No. 4,352,484.

Gertz fails to overcome the deficiencies of Chase as applied to claims 7 and 8 because neither of the applied references disclose or suggest an energy absorber wherein each of the hollow tubes are formed in a plurality of layers in a thickness direction, a film-shaped layer material having lower strength than that of a base material being inserted between end portions of the plurality of layers, as recited in claims 7 and 8. Thus, even though claims 12 and 16 have been amended to depend from claim 8, Gertz still fails to overcome the deficiencies of Chase.

Accordingly, neither of the applied references disclose or suggest all of the features recited in claim 8 so they cannot suggest claims 12 and 16 for that reason or for the additional features recited. It is respectfully requested that the rejection be withdrawn.

In paragraph 1, on page 3 of the Office Action, claims 1-16 were rejected under 35 U.S.C. §103(a) over Cronkhite et al. (Cronkhite), U.S. Patent No. 4,593,870, in view of Gertz. The rejection is respectfully traversed.

Applicant's invention of claim 1 calls for an impact resistant structure of a helicopter, comprising a plurality of energy absorbers, each one of the energy absorbers is formed in a bundled-tube state, positioned under a floor of said helicopter and directly connected to a cabin frame of said helicopter, said energy absorbers being arranged in accordance with a distribution of a ground reaction force on a general ground surface at a time of crash situation so that said energy absorbers are positioned almost directly under a pair of side walls of said frame where impact loads are concentrated at said time of crash situation. The alleged

combination of Cronkhite and Gertz fails to disclose or suggest these features as recited in claim 1 and the features of claims 7 and 8 as recited above.

In regards to claim 1, one of the features is that, for example, the energy absorbers are arranged in accordance with the distribution of a ground reaction force on a general ground surface at the time of crash situation so that the energy absorbers are positioned almost directly under a pair of sidewalls of the frame where impact loads are concentrated at the time of crash situation (page 9, lines 23-32). Accordingly, the features as recited in claim 1 provide, for example, that a helicopter can be provided with an effective impact absorption capacity against the actual crash environment typical for a crash in the case that a landing gear of a helicopter cannot properly function. Neither Cronkhite or Gertz nor the combination thereof disclose this function.

In Cronkhite, the composite crushable structures are not arranged in accordance with the distribution of a ground reaction force on a general ground surface at the time of crash situation so that the composite crushable structures are positioned almost directly under a pair of sidewalls of a helicopter frame where impact loads are concentrated at the time of a crash situation. What Cronkhite does disclose is an energy absorbing composite aircraft structure with the sandwich panel 78 having outer composite sheet laminates 80 and 82 (col. 4, lines 17-19 and Fig. 5). However, Cronkhite's composite crushable structures are positioned in a zone 40 located between bulkhead structures 26 and 26a and a zone 42 located between bulkheads 22 and 28 (Figs. 1 and 4). Accordingly, Cronkhite fails to disclose or suggest that the energy absorbers are positioned almost directly under a pair of sidewalls of the frame where impact loads are concentrated at the time of crash situation, as recited in claim 1.

Similarly, Gertz is completely silent about the above-mentioned feature of claim 1. Gertz merely discloses a structure in which foam-filled honeycomb cores are arranged in the direction of the crushing force as shown in Figs. 7 and 8 thereof. Accordingly, Gertz fails to

disclose or suggest the feature of claim 1 as described above. Therefore, there is no motivation or suggestion to combine Cronkhite with Gertz to achieve the features as recited in claim 1.

With regard to independent claims 7 and 8, neither of the applied references nor the combination thereof disclose or suggest an energy absorber which includes, in part, hollow tubes of fiber reinforced composite material, and the outer layers of fiber reinforced composite material, are arranged so as to reduce to number of intersecting walls of the hollow tubes of fiber reinforced composite material, (and/or the outer layer of fiber reinforced composite material), and each of the hollow tubes of fiber reinforced composite material (and/or the outer layer of fiber reinforced composite material) is formed in a plurality of layers in a thickness direction, a film-shaped layer material having lower strength than that of a base material being inserted between end portions of the plurality of layers, as recited in claims 7 and 8.

Cronkhite is completely silent about the above features and merely discloses composite crushable structures. Similarly, Gertz merely discloses an energy absorber made of foam-filled honeycomb cores. This energy absorber cannot suppress the harmful initial load piece in the case of crash of a helicopter. Accordingly, Cronkhite and Gertz lack the required suggestion under 35 U.S.C. §103 to modify the energy absorbers to achieve the desired features as recited in claims 1, 7, and 8 as well as the additional features recited in dependent claims thereof.

Because Cronkhite and Gertz do not anticipate or suggest the features of claims 1, 7 and 8, they cannot possibly anticipate or suggest the subject matter of claims 3-6, which depend from claim 1, claims 9, and 13-15, which depend from claim 7, and claims 11, 12, and 16, which depend from claim 8, for the reasons discussed with respect to claims 1, 7 and

8 and for the additional features recited therein. The §103 rejection is moot for cancelled claims 2 and 10. Thus, it is respectfully requested that the rejection be withdrawn.

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1, 3-9 and 11-16 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



James A. Oliff
Registration No. 27,075

Kurt P. Goudy
Registration No. 52,954

JAO:KPG/tea

Attachments:

Amended Abstract
Petition for Extension of Time
Date-stamped receipt of March 2, 2004 IDS filing
Date-stamped receipt of March 2, 2004 CFP filing

Date: April 15, 2005

OLIFF & BERRIDGE, PLC
P.O. Box 19928
Alexandria, Virginia 22320
Telephone: (703) 836-6400

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